white, pleasing tints of a flat brown, of the pheasant-egg cast, are obtained. This colour has met with approval among artist friends to whom it was shown.

The beauty of colour and fastness to light of this pigment, from such an unpromising material, may be of interest to artists' colourmen.
DAVID PATERSON.

Leabank, Rosslyn, Midlothian.

Early Spring Flowers.

YOUR readers will doubtless have been observing how the mildness of the weather this winter, so far, has hastened on the spring flowers. I am inclined to think that some of the dates mentioned below have not often been paralleled. The dates in brackets, of the usual flowering times, have been taken from Babington's "Manual of Botany" and Johnson's "Gardeners' Dictionary." December 10, 1897, *Helleborus fœtidus* (February); December 23, 1897, *Eranthis hyemalis* (February, March); December 31, 1897, *Iris histrio* (December to March); January 14, 1898, *Mercurialis perennis*, ♂ (April and May); January 14, *Corylus avellana*, ♂; January 29, ♀ (March, April); January 15, *Galanthus nivalis* (February); January 19, *Anemone hepatica* (March, April); January 20, *Anemone fulgens* (February 20, 1897), (March, April); January 20, *Ranunculus Ficaria* (February 20, 1897), (April, May); January 20, *Viola odorata*, wild (March, April); January 21, *Iris histrioides* (March); January 21, *Tussilago Farfara* (February 20, 1897), (March, April); January 21, *Berberis Aquifolium* (April); January 22, *Potentilla Fragariastrum* (April, May); January 24, *Primula vulgaris*, wild (March to May); January 24, *Crocus aureus* (February); January 26, *Omphalodes verna* (March); January 29, *Aucuba japonica*, ♂ (June). On the ♀ plant there is no sign of flower yet, and the berries have just turned red. January 29, *Ulmus surculosa* (February 21, 1897), (March to May); January 29, *Daphne Laureola* (February, March); January 29, *Arabis albida* (February 21, 1897), (February). Among other plants which began to flower in November, and have gone on until now with unusual luxuriance, we have noted *Garrya elliptica*, ♂ (just over), *Viburnum Tinus*, *Petasites fragrans*, *Lonicera fragrantissima*, *Ionopsidium acaule*, *Erica carnea*, garden violets, and primroses, single and double, and forget-me-not. I may add that on December 1, 1897, in the course of an hour, in and around the garden here, I noted upwards of 120 different kinds of plants in flower. A few were winter flowers, but most of them were belated summer and autumn ones.

Aphides are feeding on young rose and iris leaves, and slugs are playing havoc with young shoots of herbaceous and alpine plants.

A young rabbit was seen ten days ago in Devonshire, and in Gloucestershire a nest containing eggs of the blackbird and one of the robin with eggs were found about the same time.

Dadnor, Herefordshire, January 31.
E. ARMITAGE.

Insusceptibility of Insects to Poisons.

IN your review of "Notes of a Naturalist and Antiquary" in the issue of November 18, it is said that the caterpillar of the Spurge Hawk Moth "feeds exclusively on the Sea Spurge, although the plant secretes an acrid juice 'so painfully poisonous that it is difficult to imagine a digestive apparatus competent to deal with it.'"

This recalls to me a case, which came under my notice some years ago, in which a druggist had prepared a quantity of poisoned wheat for killing sparrows, then lately introduced here and a great nuisance, by soaking it in a solution of strychnine coloured with magenta. He found that on keeping it for some time in cardboard boxes it became infested with weevils; so I examined it to find if it really contained the alkaloid. The boxes were full of weevils and their excrement, and the wheat was more than half of it eaten. Strychnine was present in the wheat in the weevils, and in apparently larger proportion in the excrement, so that it had evidently passed through the digestive apparatus unchanged.
WILL. A. DIXON.

Sydney, December 31, 1897.

MR. DIXON'S letter supplies a further illustration of the curious fact that certain insect larvæ are able to feed upon poisonous plants with impunity, and can pass through their digestive system an amount of poison sufficient to kill many a more highly organised being. It is perhaps owing to their being less highly organised that they are not susceptible to the poison. Although various instances in support of the fact have been placed on record, I have not met with any attempted explanation.

M. Félix Plateau, in a paper on the phenomena of digestion in insects, published in the *Mémoires de l'Académie Royale de Belgique* (tome xii.), an abstract of which may be found in the *Annals and Magazine of Natural History* (ser. 4, vol. xvi.), has remarked that some substances resist the digestive action and are passed with the excrement—as in the case of the weevils examined by Mr. Dixon. Such, he says, are the chitine of the integuments of insects, vegetable cellulose, and chlorophyll, which by the aid of the micro-spectroscope may be detected at all parts of the alimentary tube of herbivorous insects; but he says nothing of the effects of poison.

Dr. T. R. Fraser has shown (*Ann. and Mag. Nat. Hist.*, ser. 3, vol. xiii.), that the caterpillar of *Deiopeia pulchella* feeds on the virulent poison contained in the kernel of the seed of *Physostigma venenosum*, and is unaffected by the poisonous principle of the kernel—"eserinia." Yet he ascertained by experiment that the caterpillars subjected in various ways to the action of hydrocyanic acid quickly died, proving that this species possesses no universal panacea against all poisons.

Curious to relate, another insect, a weevil *Anthonomus druparum*, feeds with impunity on the very poison which is fatal to the last-mentioned insect, namely on the kernel of *Prunus cerasus*, the poisonous properties of which depend on the hydrocyanic acid it contains. It appears, therefore, that what is one insect's food is another insect's poison, and *vice versâ*. The subject offers a fine field for investigation, and the results of further experiments, if made known, would be of interest to many besides professed entomologists.

THE REVIEWER.

Variation of Water-Level under Wind-Pressure.

IN confirmation of Mr. Wheeler's observations as to the variation of water-level under wind-pressure, two interesting beaches in the Great West Bay may be cited.

At the Chesil Bank (where all forces combine to raise the water-level) a height of 42 feet 9 inches above normal spring tide, high-water, is the height of the shingle-barrier raised by winds, waves, and currents to bar their own progress. Within the same bay, in the minor inlet of Torbay, the beach at Goodrington Sands (exposed to an easterly drift of more than 200 miles, and to waves exceeding 300 feet from crest to crest) rises 5 feet above the mark of fine weather spring tides; and this low bank is, or was when I saw it in 1889, the sole barrier between a grass field and the English Channel. The explanation clearly is that the harder it blows from the east, the more the level of the English Channel is lowered and the waters of Torbay with it.

Torquay, February 4.
A. R. HUNT.

Bipedal Lizards.

MY correspondent, Mr. H. Prestoe, has taken the trouble to examine the collections at the Natural History Museum, and by so doing has identified the bipedally-running Diamond Lizard of Trinidad, referred to in my last week's communication, with the *Ameiva surinamensis* of Gray. This identification is of additional interest, since it associates the faculty and habit of bipedal locomotion with yet a third family group of the lizard tribe, namely, that of the Teiidæ.

A good illustration of the species under notice, in a state of repose, is given in vol. v. of Lydekker's "Royal Natural History."
W. SAVILLE-KENT.

THE TOTAL ECLIPSE OF THE SUN.

THE first Indian mail dispatched after the total eclipse of January 22 has now arrived, and it brings a number of details of the work done and results obtained during the two minutes of totality. It is therefore now possible to supplement the information derived from cablegrams already published in NATURE (January 27, p. 294) with extracts from the reports of the various eclipse parties. The Government of India appears to have rendered assistance to all the observers, and it has earned the gratitude of men of science for the active interest shown in the whole of the astronomical operations. Rarely, if ever, has the work of observers been given greater facilities; and the credit for the success of the recent eclipse investigations is due, to a large extent, to the help of the Indian Government, as well as to the perfect weather which prevailed.

The invaluable aid given by the officers and crew of H.M.S. *Melpomene* was described by Sir Norman Lockyer in last week's NATURE. The results obtained by this new eclipse force appear to have exceeded the highest anticipations, and our only source of regret is that the trained perceptions of the officers and men of our ships have not previously been enlisted to advance the knowledge of solar physics by observations of solar eclipses. Naval officers are so familiar with optical instruments, that they need but a few hints to be able to make most of the observations required during eclipses. The "Melpomenes" have proved their efficiency as eclipse observers, and we hope their work will be taken as a model of what can be done upon future occasions by enlisting the sympathies of naval officers and men in astronomical investigations; for the knowledge thus obtained is both abundant and valuable. To the assistance given by Captain Batten, who took charge of all the affairs of administration and organisation, must be ascribed a large portion of the success at Viziadurg.

Sir Norman Lockyer expressed this opinion in the course of a few remarks made by him at the end of the eclipse.

"You have no right to cheer me," the *Times of India* reports him to have said, "but I have the right to cheer you, and had I a hundred and fifty throats I would do it right heartily. It is you, the officers and men of H.M.S. *Melpomene*, who have been running this camp, and we three have just stood by. You have done all the work, and you have been making a bit of history, not only for British science but for the British Navy. The records of this expedition will be logged in one of the Admiralty books, and I am proud to have been associated with you in this Eclipse Expedition of 1898. The work you have done has not only been in proportion to your numbers, a hundred and fifty to three, but you have borne the burden and heat of the day, and I thank you from the bottom of my heart for the admirable manner in which you have behaved towards we land-lubbers. We have done our best, you have done your best, and between us we have to-day accomplished what has never previously been done in the history of the world. A hundred and fifty British Bluejackets have observed an eclipse just as perfectly as if they had been drilled for years instead of a few days. We have been perfectly successful along all the lines of work we laid down, and we have done everything we tried to do. I do not really thank you a bit, but I congratulate you from the bottom of my heart upon the splendid success you have achieved."

From the various reports which have now reached this country, we make a few extracts to show what scientific results were obtained at the eclipse stations, beginning with extracts from the letter contributed by Sir Norman Lockyer to Tuesday's *Morning Post*.

VIZIADURG.

"When I come to the scientific results I hardly know how to begin, for there is so much to tell. The 'Melpomenes' have certainly beggared all former records. In the prismatic cameras every plate we hoped to expose at the different times, carefully thought out beforehand and bearing in mind the capacities of the two instruments, now bears a precious record. In the two cameras the number of spectra photographed amounts to about sixty; of these forty are distributed over four plates—'dropping plates,' as they have been called, because they drop inch by inch and second by second at the beginning and the end of the total phase. On each plate therefore we get a history of the visible solar atmosphere for ten seconds; the lengths of the arcs tell how the different chemical constituents are distributed, and their positions tell us exactly what the constituents are. In some of these records it has been roughly estimated that we have to deal with a thousand lines. It is pretty certain, then, that many months of careful measurements will be necessary before we can form a detailed idea of the advance secured.

"As was anticipated, the increased dispersion has distinctly helped us on in our knowledge of the corona. Several beautiful corona images have been secured on both of the prismatic cameras. The want of any visible connection between the materials of the corona and of the chromosphere is again demonstrated. The definition in some of the plates is so good that the bases of the streamers are depicted in the coronal rings, while the prominence and chromosphere rings take no notice of them whatever. This result seems entirely in harmony with the telescopic observations of the structure of the corona which I made with a 3¾-inch Cooke telescope. The prominences seemed entirely disconnected from the corona structure lying near them, and there was no increase of luminosity as the prominences were approached."

The "flash" spectrum was photographed, both at the beginning and end of totality, with the six-inch and nine-inch prismatic cameras. The results of the six-inch camera with the two prisms (see p. 295) surpass all previous records; about double the number of lines photographed in Novaya Zemlya in 1896 being recorded upon the plates. Photographs of the corona were obtained with a four-inch telescope fed by a cœlostat. Lieut. Blackett, R.N., in charge of the star observations, reported the appearance of some object between Mars and Jupiter, where no star down to the third magnitude occurs on the chart. Prof. Pedler, using a grating spectroscope, observed during the total phase "that the strong arc lines of iron and magnesium were visible on the inner corona, while no spark lines were seen."

Meteorological Phenomena.

Mr. J. Eliot, F.R.S., the Meteorological Reporter to the Government of India, says:—

"The meteorological phenomena accompanying the eclipse were much less striking than was anticipated. Observations expressive of the air were taken with a barometer and a Richard Frère's continuous self-registering barograph. The trace on the barograph on the 22nd was practically identical with those on the 21st and 23rd, and the influence of the solar eclipse was either nil or very small, and will require careful examination of the traces to detect.

"Observations of the temperature of the air were taken by means of six thermometers by Bailey, which had been carefully tested at Kew, and also by means of a Richard Frère's thermograph. The observations show that temperature rose more slowly than usual from 11 a.m. until about totality, when it fell rapidly about 5° F., and was constant for some time after totality.

"This fall in temperature at Viziadurg was partly at first due to the usual change from land winds to sea breezes, which usually takes place at noon. On the day of the eclipse easterly winds prevailed during the previous night and morning until about 12.15 p.m. A short period of calms and light airs obtained until three minutes before totality, when the wind shifted to west, and blew more or less steadily and strongly during the remainder of the day. The only instrument which showed any large influence due to the eclipse was the solar radiation thermometer. It rose steadily from sunrise until about 5 minutes after the commencement (*i.e.* 11.15 a.m.), when it read 144° F. It fell continuously and with increasing rapidity until the end of totality, when it registered 81½° (practically the temperature of the air.) During the latter part of this period it fell at the rate of upwards of 4° in five minutes."

SAHDOL.

The observations at Sahdol (says the *Pioneer* of January 25) were completely successful. The Astronomer Royal exposed seven large plates during totality, and twenty four more during the partial phases. His photographs show the sun's image four inches in diameter. Prof. Turner took twelve pictures during totality, and two plates in polarised light. The photographs taken by the Astronomer Royal and Prof. Turner during the eclipse have been developed, and are highly successful.

Mr. Mitchie-Smith, the Madras Government Astronomer, took seven good photographs with a 40-foot telescope. Photographs of the coronal spectrum were taken by Mr. Moos. Several draughtsmen of recognised ability, including General Strahan, Sir Thomas Holdich, General Woodthorpe, and Colonel Barr, made coronal drawings during totality.

WARDHAGANJ.

The eclipse was observed here perfectly. Twelve photographs of the corona were secured and twenty-four photographs of the spectrum. All the photographs developed are very good.

Captain Hills' corona spectra are excellent, showing a small radial extension of the lines. Captain Hills obtained a series of exposures for the flash at the beginning and end of totality, showing the whole spectroscopic history of the sun's limb, from the solar spectrum through the flash to the prominence.

Mr. Newall found the coronal spectrum too faint at a quarter diameter from the sun's limb for determination of the velocity in the line of sight, but caught the bright lines in the spectrum on another photograph at the end of totality. Mr. Newall observed very strong polarisation in the corona visually, and also observed the green coronal ring with the objective grating spectroscope.

JEUR.

The eclipse party from the Poona College of Science, under Prof. K. D. Naegamvala, had its camp at Jeur, and within two hundred yards of it were the Lick observers, under Prof W. W. Campbell. At Jeur were also the Japanese astronomers, under the direction of Prof. Taero, with Prof. Hiramaya and two assistants. Two miles further south was Mr. C. Burckhalter, with Major Harkness, Captain Dugon, and others. Every branch of eclipse work was represented at Jeur.

All the eclipse parties at this station may well be congratulated on the successful issue of their arduous labours and careful preparation. Thirty good photographs of spectra, fifteen of which are excellent, were secured by Prof. Naegamvala, and about the same number by Prof. Campbell. In the case of the Poona eclipse party these preparations were rendered particularly arduous by the very late arrival of some of the principal instruments sent out from England; Prof. Naegamvala's Cooke 6-inch spectroscope having only arrived on January 11. Upon this instrument two prisms of 45° were mounted, and the length of spectrum given by them was twelve inches. The "flash" spectrum was caught on three plates, and on one spectrum the length from D_3 to H is eight inches. The Maharajah of Kohlapore, who had liberally supported Prof. Naegamvala with funds for the eclipse instruments, specially deputed Prof. Apte to join the Poona party Prof. Apte secured some very interesting observations on the visibility of planets during the course of the phenomenon, and they will be of value in determining the intensity of the corona light.

In addition to the information given in the foregoing extracts, we learn that at the British Astronomical Association's camp at Talni good photographs of the corona were obtained, and Mr. Evershed succeeded in photographing the "flash" spectrum, and in carrying out the whole of his extensive spectroscopic programme. At Gogra, north of Nagpur, Dr. Copeland obtained photographs of the corona with his telescope of 40 feet focal length. Particulars of the instruments employed at the various stations have already been given in NATURE.

PITCHER-PLANTS.[1]

AMONG recent additions to the attractions of Kew Gardens is a house largely devoted to pitcher-plants; and the past year has seen several important additions to our knowledge of this very interesting class of plants.

Pitcher-plants, as enumerated by Prof. Vines, are found in ten genera, distributed through five widely separated natural orders, viz. (1) Sarraceniaceæ (*Sarracenia*, *Darlingtonia*, *Heliamphora*); (2) Nepenthaceæ (*Nepenthes*); (3) Asclepiadaceæ (*Dischidia*); (4) Saxifragaceæ (*Cephalotus*); (5) Lentibulariaceæ (*Utricularia*, *Genlisea*, *Polypompholyx*, *Biovularia*). Of these the only natives of this country are the "Bladder-worts" (*Utricularia*), of which several species are not uncommon in running and standing water. But the genus with which the name is usually associated is *Nepenthes*, the only representative of the order, to which about thirty-two species are assigned by Bentham and Hooker, natives of the East Indian Archipelago, or scattered through Asia, Africa, Madagascar, and Australia;[2] but the number of known species is now considerably larger. About forty species or hybrids are now under cultivation at Kew. Mr. H. J. Veitch—whose firm has done so much for the introduction of these plants into cultivation—in his admirable account of the genus in the *Journal* of the Royal Horticultural Society, gives twenty-four as the actual number of true species in cultivation, in addition to a large number of varieties, and primary, secondary, or tertiary hybrids.

Nepenthes is not grown for the sake of its blossom. The flowers, borne in terminal inflorescences, are small, and of simple type, the perianth consisting of four usually green segments. They are unisexual and diœcious. I find no reference to any insect-visitors to the flowers; and they are probably anemophilous. The interest of these plants centres in the remarkable terminal appendages to the leaves in all the known species, the ascidia or pitchers, which are constructed on a uniform general type, though varying greatly in size, form, and colour. To promote the formation of these pitchers, cultivators usually "stop" the blossoming, so that special cultivation is needed for the production of hybrids. The pitcher itself is generally regarded as an expansion of the petiole or leaf-stalk; Sir Joseph Hooker describes it as a "modification of a gland situated at the apex of the midrib of the leaf." The lid is always completely closed until maturity, and the fluid is excreted within the enclosed chamber.

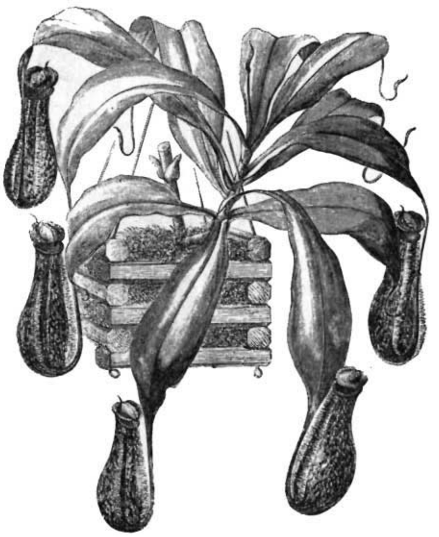

FIG. 1.—*Nepenthes Sedenii*, one-sixth natural size.

The composition and properties of this fluid have been the subject of many investigations. Notwithstanding that one or two recent inquirers have come to a contrary conclusion, the observations and experiments of Prof. Vines may be said to have finally settled the point that it contains a true digestive principle. The teleological bias of the eighteenth century connected these pitchers of water with the needs of thirsty travellers or of birds. Linnæus describes the pitchers as "aquam dulcem limpidam, amabilem, confortantem, frigidam suppeditantia, ad necessarium hominis usum," and goes into raptures when adopting the name *Nepenthes* proposed by Breyne:—"Cum enim et haec non Helenæ Nepenthes, certe Botanicis omnibus erit. Quis Botanicorum longissimo itinere profectus, si mirabilem hanc plantam reperiret, non admiratione raperetur, totus attonitus, praeteritorum malorum oblitus, mirificam Creatoris manum dum obstupescens adspiciret?" There are unfortunately two valid arguments against Linnæus's theory:—In the

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[1] S. H. Vines, "The Physiology of Pitcher-Plants." (Reprint from *Journ. Roy. Hort. Soc.* vol. xxi., 22 pp.)
S. H. Vines, "The Proteolytic Enzyme of Nepenthes." (*Annals of Botany*, December 1897, pp. 563–584.)
H. J. Veitch, "Nepenthes." (*Journ. Roy. Hort. Soc.* 1897, pp. 226–255.)
F. W. Burbidge, Remarks on the above. (*Tom. cit.* pp. 256–262.)
F. M. Bailey, "Contributions to the Flora of Queensland," vol. i. part 1, July 1897.

[2] Mr. Bailey describes and figures two new species from Queensland.